

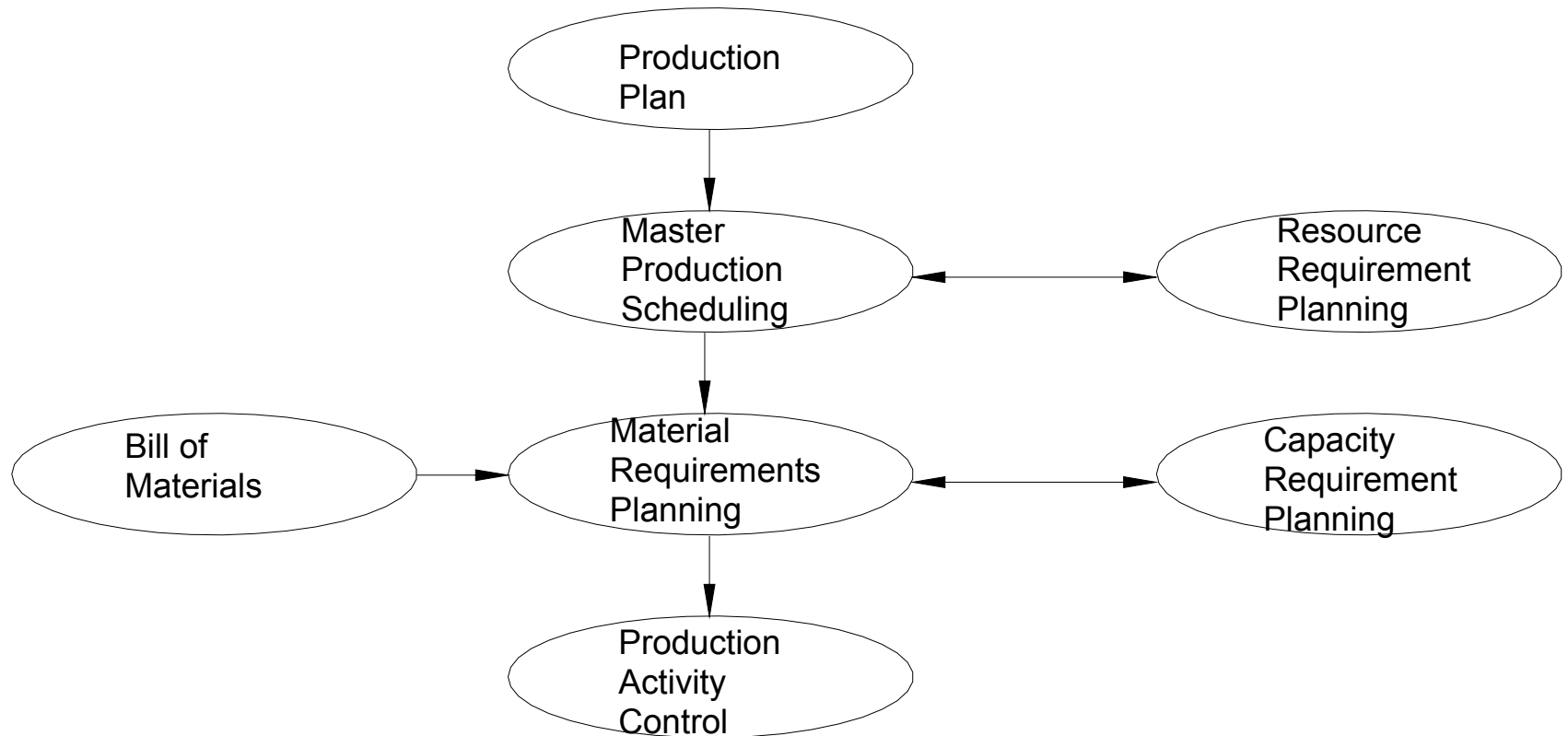
# CAD/CAM Principles and Applications

## Ch 19 Production Planning and Control

# Objectives

- Understand the needs of master production schedule (MPS) and methods to develop it.
- Appreciate the place of material requirement planning (MRP) in the manufacturing operations and develop methods to link bill of materials (BOM) and MRP.
- Plan and execute the production activity control (PAC), which actually deals with operations in the shop floor.
- Understand the information integration methods that are commonly used in industries such as MRP II, OPT and JIT.

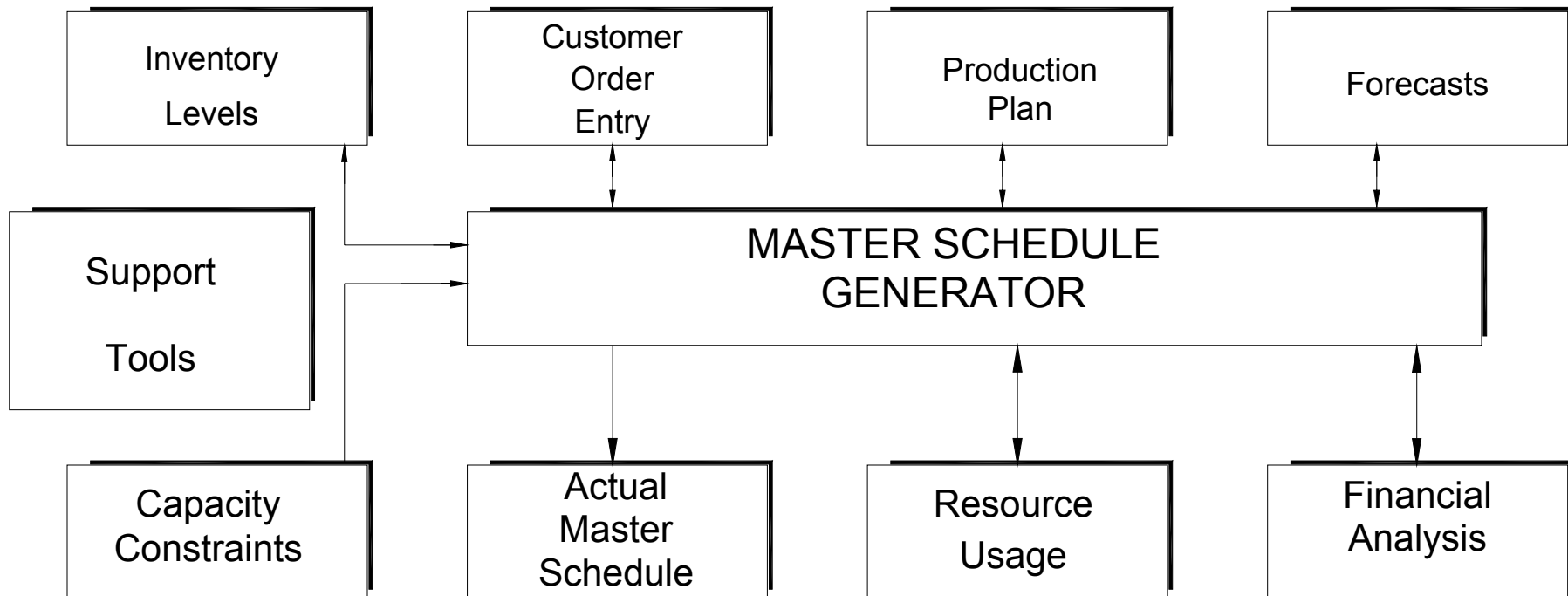
**Fig. 19.1** The various components of the production planning and control system.



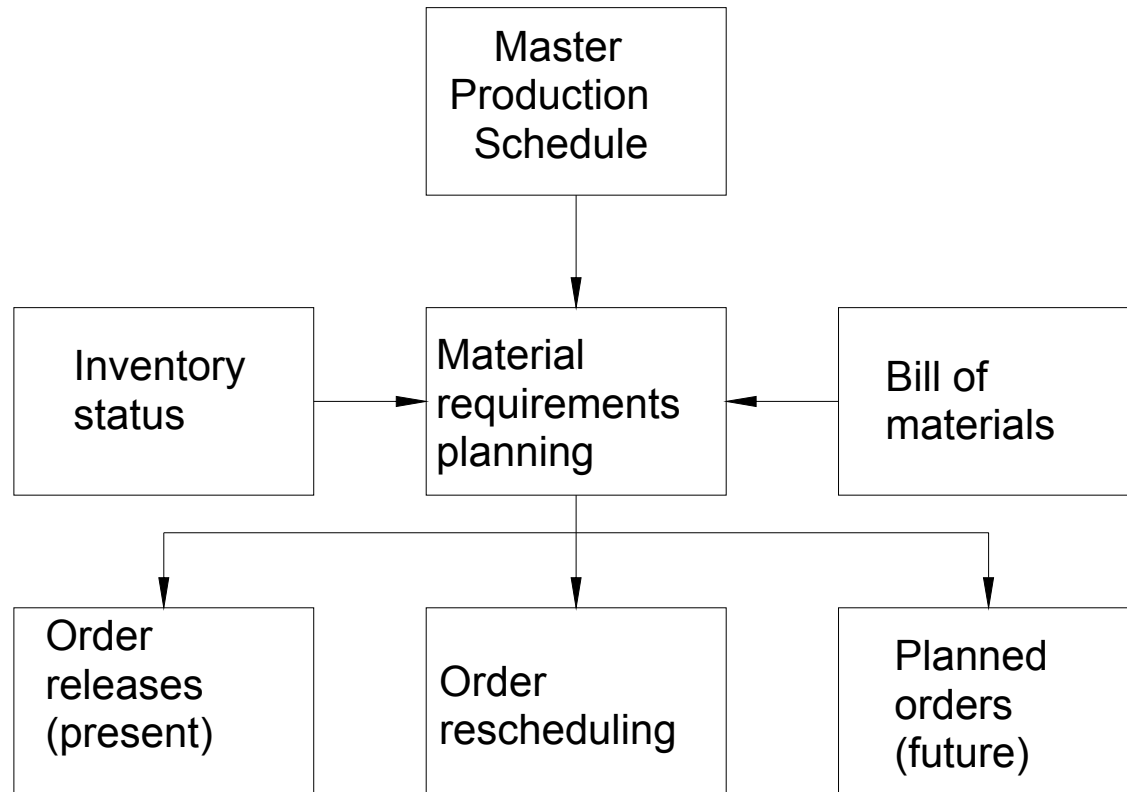
# 19.1 Master Production Schedule

- As per the APICS master production schedule is *the anticipated build schedule for those items assigned to the master schedule. It represents what the company plans to produce expressed in specific configurations, quantities and dates.*

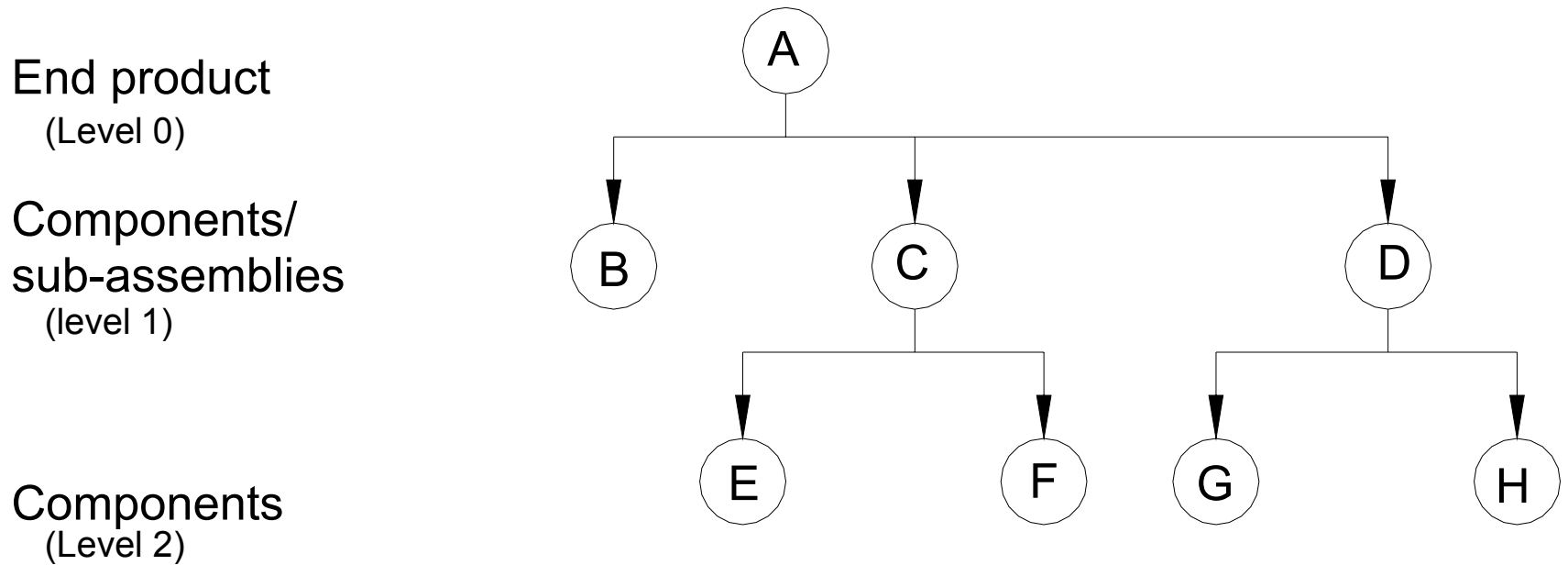
**Fig. 19.2** The various stages involved in the manufacturing of a product in concurrent engineering environment



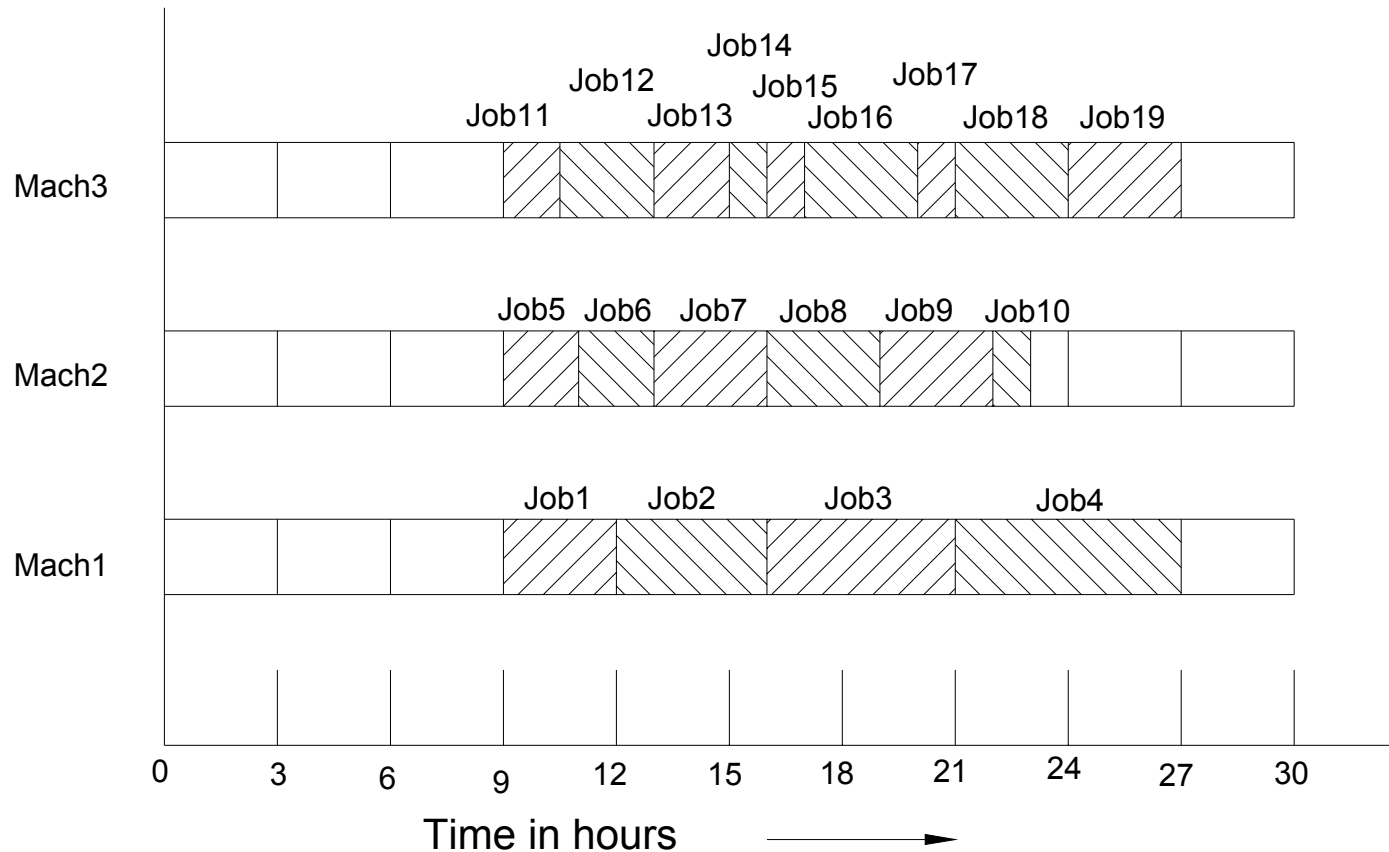
**Fig. 19.3** The various stages involved in the manufacturing of a product in concurrent engineering environment



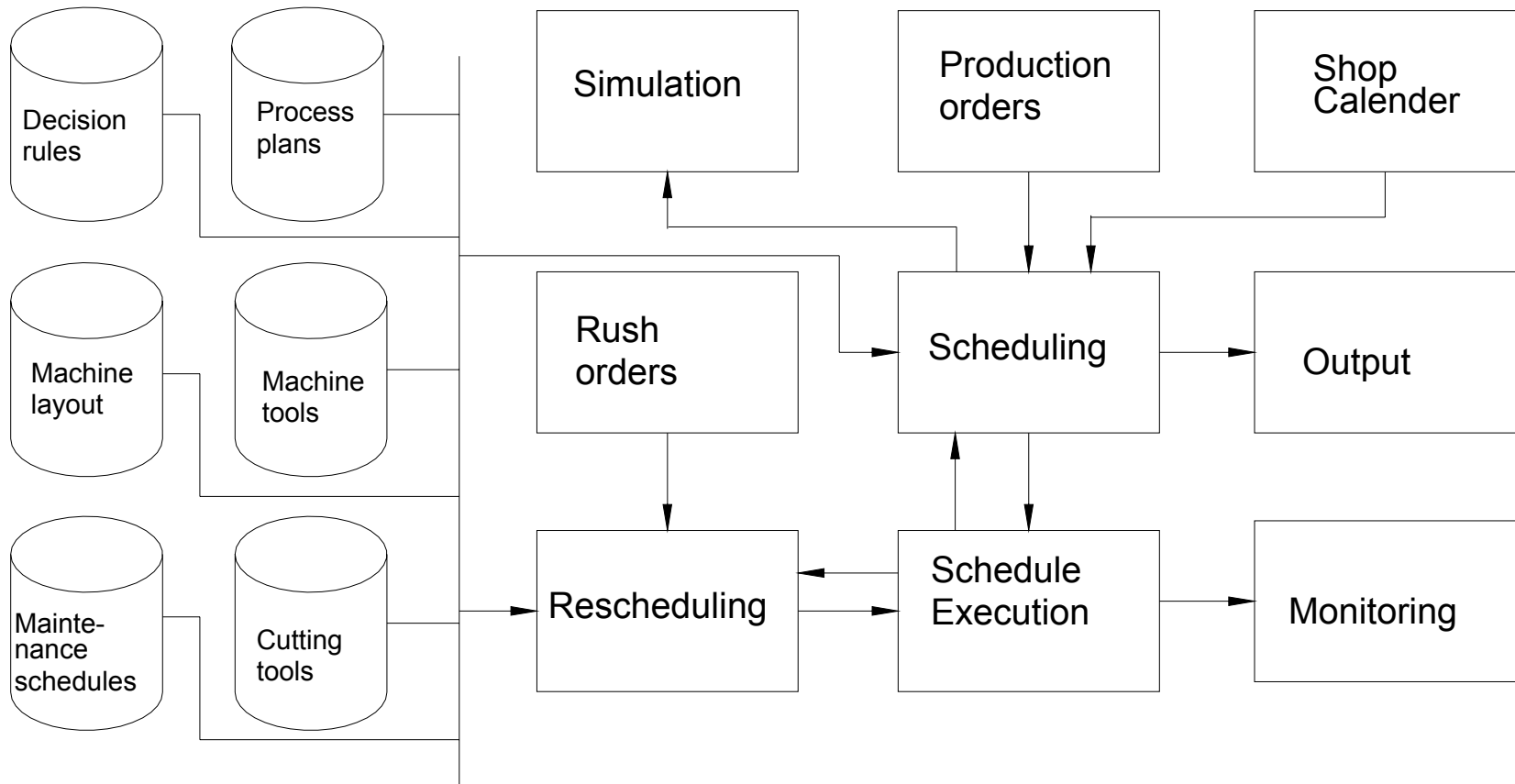
**Fig. 19.4** The bill of material (BOM)



**Fig. 19.5** Typical Gantt chart showing the jobs scheduled on different machines



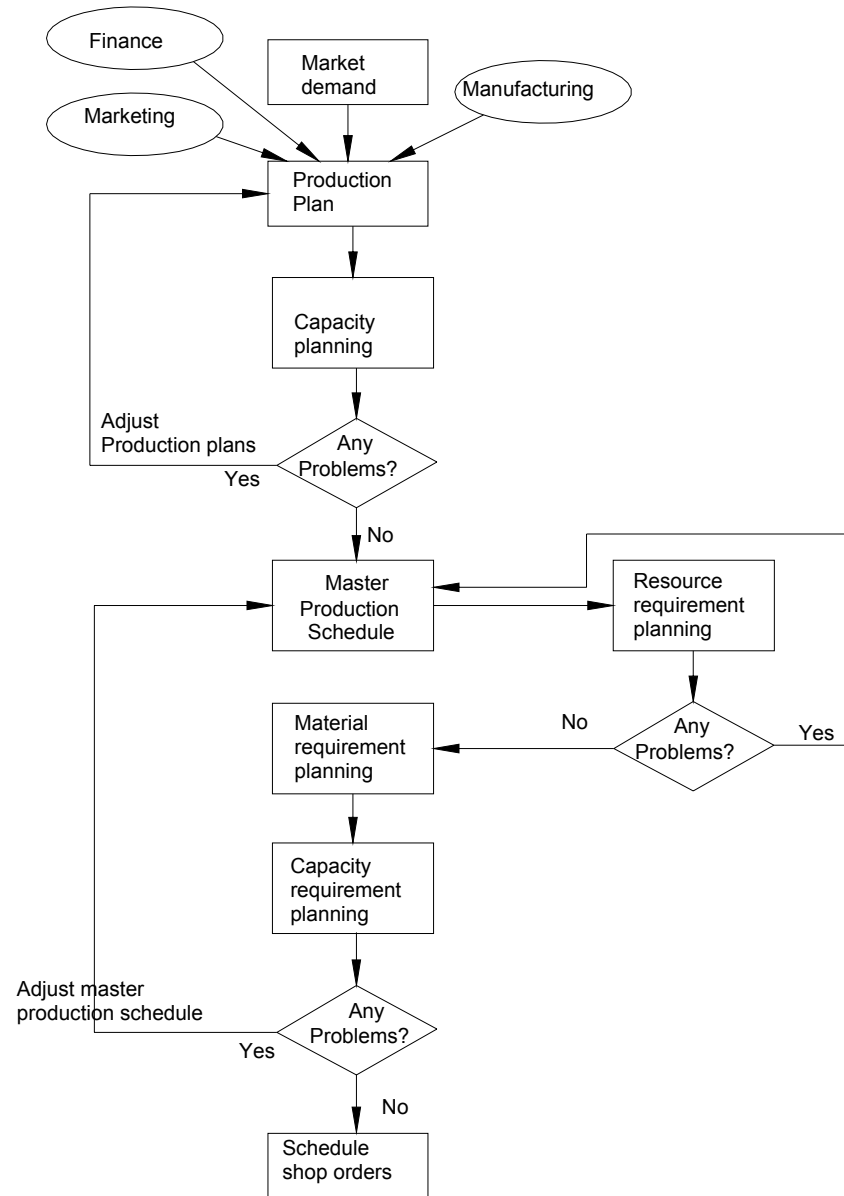
**Fig. 19.6** Typical components of a production activity control function



# 19.4 Optimised Production Technology (OPT)

- A bottleneck is defined as a point or storage in the manufacturing process that holds down the amount that a factory can produce. It is where the flow of materials being worked on, narrows to a thin stream.

**Fig. 19.7**  
 Manufacturing  
 resource planning  
 (MRP II) system



# 19.6 Just In Time (JIT)

- Zero defects
- Zero set-up time
- Zero inventories
- Zero handling
- Zero breakdowns
- Zero lead time
- Lot size of one

# Summary

- Master production schedule (MPS) is the main starting point of all manufacturing operations. This represents the plans of the enterprise for manufactured products in specific configurations, quantities and dates.
- Developing an MPS that is reasonable and realisable within the resources constraints is one of the important elements of a successful organisation.
- Using the MPS, material requirement planning (MRP) produces the requirements of material to achieve the required production as envisaged in the MPS.
- MRP will have to link with the external vendors as well as in house production facilities to meet the demand of materials as outlined in the MPS.

# Summary

- MRP also interacts with the bill of materials to explode the MPS into material requirement, as well as the inventory management system to keep track of the storage and lead times for procurements to plan the appropriate strategies and times to order material to satisfy the demand.
- Production activity control (PAC) deals with the actual operation of the shop floor and methods that are used to organise and control the shop floor.
- PAC can be modularised into planning, execution and control stages to achieve its objectives.
- Planning part of PAC prepares a schedule of shop floor operations on a continuous basis to optimise the various indicators of its performance such as work in process, flow time, make span, etc.

# Summary

- Optimised production technology (OPT) utilises the concept of bottleneck in manufacturing to integrate the factory operations.
- Manufacturing resource planning (MRP II) is a comprehensive system that tries to integrate all the modules in a manufacturing operation to make the information available instantaneously wherever it is needed.
- Just in time (JIT) is a philosophy that tries to enunciate principles to eliminate the various types of waste that is part of a manufacturing operation.